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ERNEST ORLANDO LAWRENCE
BERKELEY NATIONAL LABORATORY

ENVIRONMENT, SAFETY & HEALTH SELF-ASSESSMENT REPORT FISCAL YEAR 2000

Environment, Health and Safety Division
Office of Assessment and Assurance
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APPENDICES

Executive Summary

For the Fiscal Year 2000 reporting period, the Laboratory Self-Assessment Program focused on the implementation and effectiveness of Integrated Safety Management (ISM) in division operations. FY00 represents the third year that the division environment, safety, and health (ES&H) performance was assessed against criteria using the core work functions and guiding principles of ISM. In addition, the lines of inquiry for the management of ES&H (MESH) reviews conducted by the Safety Review Committee (SRC) this year were also aligned with ISM functions and principles. The Integrated Functional Appraisals (IFAs), the third component of Berkeley Lab's Self-Assessment Program, continued with its focus on the technical assessment of division controls of medium and high-hazard facilities.

Based on the results of the division self-assessments, the SRC MESH reviews, and the IFAs, overall division ES&H performance was deemed to be excellent to outstanding. Full implementation and effectiveness of ISM was evident for all divisions. Most divisions continue to demonstrate gradual improvement of their ES&H programs and greater adherence to the principles of ISM. In particular, three divisions rated excellent to outstanding for all performance criteria. Berkeley Lab's FY00 ES&H performance rating, along with comparisons with last year's rating and with the FY99 UCOP and DOE Appendix F ratings, are shown in the table below.

FY00 ES&H Performance		**Comparisons**		
ISM-Based Performance Criteria	**Self-Assessment Performance Rating**	**FY99 Self-Assessment Rating**	**FY99 UCOP Appendix F Rating**	**FY99 DOE Appendix F Rating**
1. Define the scope of work	**99.5 %**	97.4%	95%	95%
2. Identify and analyze hazards	**100 %**	98.5%	95%	95%
3. Control the hazards	**100 %**	99.0%		
4. Perform the work	**91.9 %**	87.0%	95%	87%
5. Feedback and improvements	**98.4 %**	94.8%	98%	92%
Overall Performance Rating	**96.5 %**	93.6%	95.8%	92.2%

Division accomplishments from this year's ES&H performance include:

- **Increased involvement from line management in ES&H issues.** The divisions demonstrated active line management involvement in ES&H issues. In most divisions, line management actively participates in workspace inspections, hazard reviews, and safety committee activities. Also in this

reporting period, division management demonstrated a strong commitment to ES&H in that almost every division director performed a walkthrough of divisional space.

- **Systematic and documented hazard reviews.** The divisions continue to refine their hazard review processes. Divisions are now very diligent in performing hazard reviews. Most divisions have excellent documentation of their hazard reviews, as they have adopted systems deemed effective in other divisions. In most divisions, principle investigators and group leaders perform hazard reviews, rather than the division ES&H coordinators. This demonstrates greater line management involvement and less reliance upon ES&H coordinators.

- **Active safety committees.** All divisions have demonstrated their commitment to ES&H with active safety committees. Many of the divisions' ES&H committees meet monthly. Some divisions have multiple safety committees. In most divisions, the safety committees play an active role in reviewing ES&H data and communicating lessons learned to all staff (through the dissemination of meeting minutes and safety bulletins).

- **Work within authorizations.** Almost all authorized work was performed without major deficiencies. In addition, most training required for authorized work was completed. Divisions also demonstrated a very high compliance level with satellite accumulation area (SAA) requirements. Ninety-one percent of all inspected SAAs were compliant with state and federal regulations.

In spite of the considerable progress made this year in division ES&H performance, the FY00 self-assessment process did identify ES&H issues where improvements are recommended. These issues require institutional rather than divisional follow-up. Thus, the Office of Assessment and Assurance will develop the corrective action plan to address these issues. The areas requiring institutional improvements include:

- **Chemical inventory.** There is still a need to develop a less labor-intensive and more valuable information system for users than currently exists. EH&S staff have been using students to update the chemical inventory database. This methodology is a short-term solution. Due to the high demand for services, the students have been unable to provide timely updates for every division requesting their help. Also, this service doesn't provide a database that remains current. In the future, EH&S will employ a more interactive system, taking advantage of a Web-based inventory database and bar-coding technology.

- **Corrective actions database.** The use of the Laboratory Self-Assessment Database (LSAD) by divisions to track self-assessment corrective actions is uneven. Divisions are inconsistent in their assignment of institutional and noninstitutional findings and in their assessment of hazard levels of findings. The divisions should use the guidelines prescribed in the Self Assessment Manual (PUB-3105) for more consistent application of the LSAD. Divisions must also take responsibility to ensure that findings are forwarded to the Work Request Center for resolution. EH&S is developing a universal Web-based database. This will improve consistency and encourage use of the LSAD.

- **ES&H training.** Several divisions use internal systems for tracking training and job-hazard-profile completion rates. As a result, EH&S staff must manually enter training information for these divisions into the EH&S Training Database. Manual entry is inefficient and results in inaccurate training data. Divisions that use internal systems for tracking training should develop electronic databases, and EH&S should work with these divisions to accommodate their programs in a more efficient manner.

- **Ergonomics.** Although most divisions demonstrated during the self-assessment process that they have implemented ergonomics programs, ergonomic hazards continue to be a leading source of recordable injuries. Divisions must promote ergonomic awareness. Divisions should require people to attend ergonomic training and perform ergonomic evaluations on all at-risk workers.

Introduction

Berkeley Lab's environment, safety and health (ES&H) Self-Assessment Program is a key Laboratory operation to ensure that the workplace is safe, hazards are controlled, and the environment is protected. Designed to promote continuous improvement and regulatory compliance, the program is a means to identify Berkeley Lab's strengths and weaknesses in the areas of ES&H. The Self-Assessment Program consists of three types of formal appraisal, shown in the table below.

Assessment	Type of Review	Frequency	Performed by
Division Self-Assessment	workplace safety	annual	division line management
Integrated Functional Appraisal (IFA)	in-depth ES&H technical	triennial	EH&S personnel
Safety Review Committee MESH	safety management	triennial	peer researchers and staff

Divisions evaluate their operations against ES&H performance criteria and conduct inspections to identify the presence of inadequately controlled or uncontrolled hazards. IFAs serve as independent technical reviews on divisional control of hazards, focusing primarily on medium- and high-hazard operations. The Safety Review Committee (SRC) conducts peer reviews of division management of ES&H (MESH).

The Office of Assessment and Assurance (OAA) validates the division self-assessment results and evaluates each division's management of ES&H against the performance criteria. In its evaluation, OAA also identifies noteworthy practices and ES&H conditions and trends that may warrant Laboratory management action. OAA prepares the annual institutional ES&H Self-Assessment Report for senior Laboratory management and DOE.

Because the ES&H performance criteria are critical indicators for the management of ES&H by divisions, much of this report focuses on the division self-assessments. The division performance criteria for the FY00 reporting period (October 1, 1999, through June 30, 2000) are based on the five core work functions and seven guiding principles of Integrated Safety Management (ISM). This is the third year that Berkeley Lab has used the ISM-based criteria. The FY00 criteria (Appendix A) assess division performance against the ISM work functions to (1) define the scope of work, (2) identify and analyze hazards associated with the work, (3) develop and implement hazard controls, (4) perform the work within controls, and (5) provide feedback and improvements. Integrated into the criteria are expectations that address the division's adherence to the ISM principles. The principles are (1) line management accountability, (2) clear roles and responsibilities, (3) staff competence, (4) balanced priorities, (5) identification of safety standards, (6) requirements and operations authorization, and (7) hazard controls tailored to the work.

The ES&H performance criteria are also closely aligned with the performance objectives, criteria, and measurements of Berkeley Lab's contract with the U.S. Department of Energy (Contract 98, Appendix F). For this reason, this report provides a comparison of performance ratings between the division self-assessments and Appendix F.

The FY00 ES&H Self-Assessment Report is prepared in accordance with *the LBNL Self-Assessment Program Implementation Plan* (PUB-5344) and satisfies the requirement in Contract 98 for an annual self-assessment summary report.

Division Self-Assessment

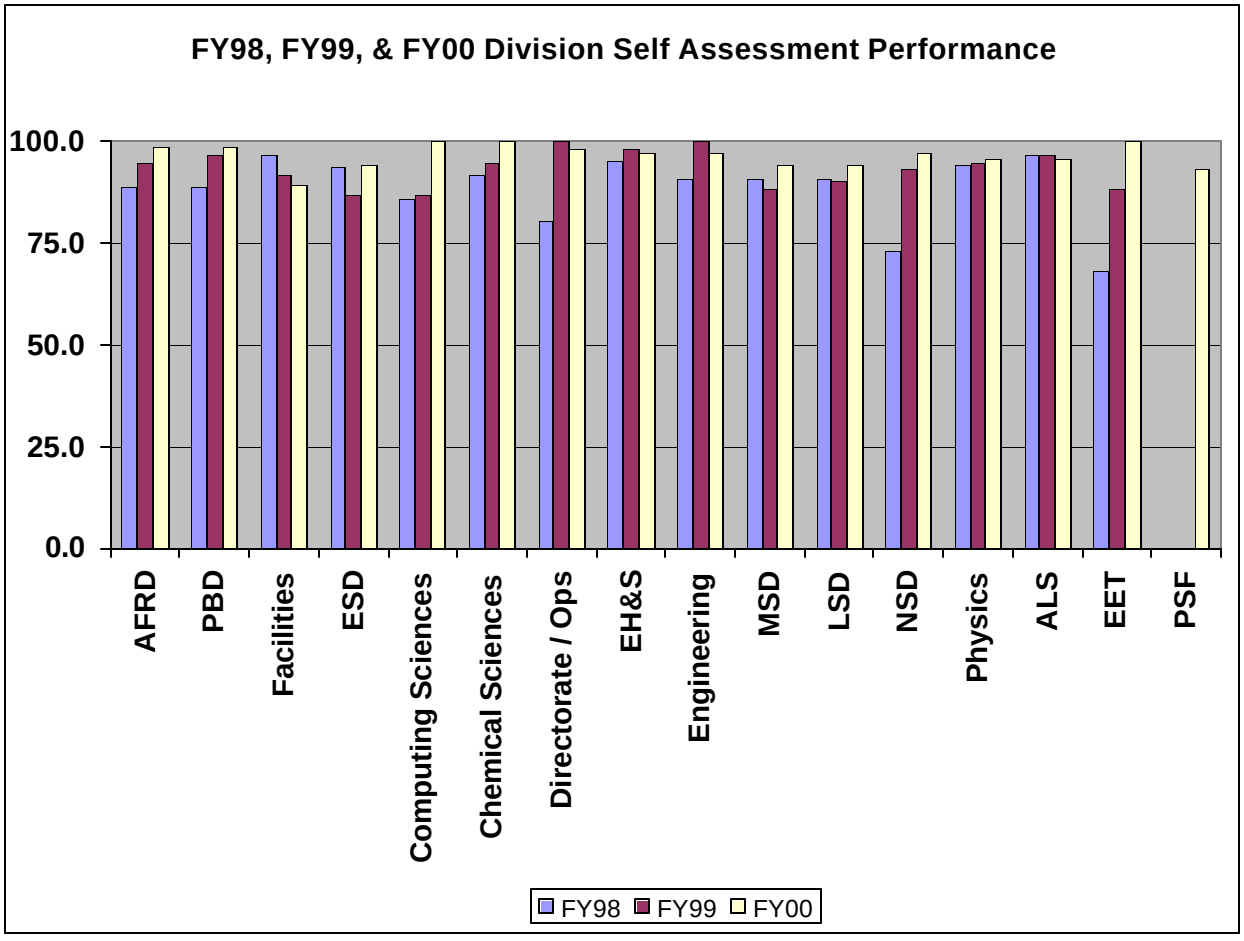
Performance Rating

Rating the division ES&H performance is based on a color-coded system of determining whether each performance criterion and expectation is fully met, partially met, or marginally met. Points are assigned for the three performance gradients, and a percent performance is calculated for each criterion and expectation and for overall division performance. The rating system is consistent with the percent performance rating used in Appendix F. The color-code and point system is as follows:

3 pts	Green indicates that the criterion/expectation is fully met at a >85% performance level, and performance is deemed to be excellent to outstanding. For waste management performance, there are no Nonconformance and Corrective Action Reports (NCARs), a QA failure rate <5% above the Laboratory average, an SAA compliance rate >90%, and a net waste reduction. For reportable occurrences, there is one or fewer occurrence, or fewer occurrence reports (ORPs) than the three-year divisional average. For injury and accident rates, there is a total reportable case (TRC) rate >25% below the DOE average, or a 20% improvement from last year, or one case or fewer.
2 pts.	Yellow indicates that the criterion/expectation is partially met at a 60–85% performance level, and performance is deemed to be marginal to good/excellent. For waste management performance, there are no NCARs, a QA failure rate between 5% and 8% above the Laboratory average, an SAA compliance rate between 75% and 90%, and a net waste increase. For reportable occurrences, the number of ORPs equals the three-year divisional average. For injury and accident rates, there is a TRC <25% below or above the DOE average, or a 10% improvement from last year, or two cases.
1 pt.	Red indicates that the criterion/expectation is marginally met at a <60% performance level, and performance is deemed to be unsatisfactory to marginal. For waste management performance, there are one or more NCARs, a QA failure rate >8% above the Laboratory average, and an SAA compliance rate <75%. For reportable occurrences, there are more ORPs than the three-year divisional average. For injury and accident rates, there is a TRC >25% above the DOE average.
0 pt.	Not applicable to the division.

Overall Performance Results

The divisions' self-assessment performance for the FY00 reporting period continued the upward trend established by the FY99 report. Most divisions improved their performance with regard to the ISM-based performance criteria. The divisions focused on key criteria and expectations identified as opportunities for improvement in the FY99 ES&H Self-Assessment Report. Areas of improvement included ES&H performance evaluations, chemical inventory database, line management involvement, and tracking corrective actions. The FY00 performance ratings for each division are summarized in Appendix B. Overall improvements in division ES&H performance from the previous years are as follows:



Three divisions addressed all deficiencies noted in the FY99 Self Assessment Report and received outstanding ratings for each performance criteria: (1) Computing Sciences fully implemented their ES&H plan and addressed shortcomings in training and LSAD completion rate. (2) Environmental Energy

Technologies resolved faults in their training performance, waste characterization, and LSAD completion rate. (3) Chemical Sciences successfully mitigated deficiencies in training performance and job hazard questionnaire (JHQ) completion, and improved ES&H communication within the division, especially to staff working in UC space.

Performance Results by Criteria and Expectation

Laboratory divisions assessed their ES&H performance against each of the FY00 performance criteria and the related expectations. The division self-assessments and the subsequent OAA validation activities resulted in the identification of noteworthy practices and opportunities for improvement. Each division's noteworthy practices and opportunities for improvement are summarized in Appendix C. Overall division performances against each criterion and expectation are described below.

Criterion 1: Define the Scope of Work
Performance Rating: 99.5%

Laboratory divisions integrate ES&H into their research and operations. In defining their scope of work, divisions must demonstrate that (1) roles and responsibilities for ES&H are strongly communicated to all levels of the organization; (2) staff, guests, and visitors are held accountable for their ES&H performance; (3) the division safety plan is implemented and regularly updated; and (4) adequate resources and funds are allocated to address ES&H issues.

Criterion 1 Expectations	AFRD	ALS	Chemical Sciences	Computing Sciences	Directorate	EH&S	Engr	EETD	ESD	Facilities	LSD	MSD	Nuclear Sciences	Phys Biosci.	Physics	PSF	Expectation Score
Evidence of strong ES&H communication (y/n)	yes	yes	yes	yes	yes	yes	yes	yes	partial	yes	yes	yes	yes	yes	yes	yes	97.9%
Employees, guests & visitors accountable for ES&H (y/n)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100%
Evidence that ES&H plan is being implemented (y/n)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100%
Resources and funds adequate to address all ES&H issues (y/n)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100%
Division Score	100%	100%	100%	100%	100%	100%	100%	100%	91.7%	100%	100%	100%	100%	100%	100%	100%	99.5%

Division Performance

1. Most divisions maintained or improved their level of effort to communicate ES&H throughout their organization. All divisions have active safety committees, with most division committees meeting monthly. Several divisions (LSD, Physics, Facilities, MSD, AFRD, ALS) have multiple safety committees. In Engineering, each group has a monthly safety meeting.

2. In many divisions, line management is actively involved in communication of safety. Several deputy directors include management of ES&H as part of their day-to-day responsibility (LSD, CSD, ESD, MSD, ALS, NSD, Computing Sciences). In most divisions, safety committee membership includes line

managers. Two division directors (AFRD, Directorate) sent a memo to all employees addressing ES&H. Three divisions (Computing Sciences, Physics, NSD) conducted all-hands meetings to discuss ES&H in general, as well as recent ES&H issues.

3. All divisions incorporate ES&H requirements into their annual employee reviews (P2Rs). In addition, all divisions are extending health and safety requirements to their participating guests. MSD requires all employees, visitors, and guests to complete a MSD training checklist and does not allow an individual to perform work until all training requirements are met. Chemical Sciences requires all PIs to sign a Safety Assurance Statement and Project Hazard Questionnaire annually, and all participating guests are required to complete a JHQ. The ALS Division requires all visitors to be trained before they gain entry to the ALS.

4. All divisions have conducted their annual reviews and approvals of their division safety plans.

5. All divisions have been able to secure sufficient funds and resources to address their ES&H issues.

Opportunities for Improvement

1. Having ES&H as a performance item in the P2R process should continue. However, methods of holding participating guests accountable for ES&H should be more evident. Only a few divisions document that their participating guests are responsible for ES&H. Divisions should emulate successful practices, such as requiring all participating guests to complete a training checklist and all applicable training prior to performing work, or supervisor verification via a Safety Assurance Statement.

Criterion 2: Identify and Analyze Hazards
Performance Rating: 100%

Laboratory divisions review their research and operations to identify hazards associated with the work. Divisions must at least annually review their authorized work to identify changes that may affect the safety envelope and conduct an inventory of their chemicals.

Criterion 2 Expectations	AFRD	ALS	Chemical Sciences	Computing Sciences	Directorate	EH&S	Engr	EETD	ESD	Facilities	LSD	MSD	Nuclear Sciences	Phys Biosci.	Physics	PSF	Expectation Score
% work with hazard analysis	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
% authorizations/work being reviewed within past 12 months	100%	100%	100%	NA	NA	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	NA	100%
Chemical inventory updated within past 12 months (y/n)	yes	yes	yes	NA	NA	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100%
Division Score	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Division Performance

1. All divisions perform hazard reviews of all projects and programs. In some divisions (CSD, EETD, ALS, Engineering, LSD, MSD, Physics), PIs document hazard reviews. In some divisions (Computing Sciences, Directorate, EETD, EH&S, Engineering, MSD), hazard reviews are incorporated into a formalized inspection process performed by division safety officers and PIs. In Facilities, project leads document hazards and include this information on work orders. This is an effective way to communicate hazards to staff.

2. All divisions have reviewed division work under formal authorizations (e.g., RWAs, RWPs, AHDs, and SAAs) within the past year.

3. The divisions are responsible for maintaining a current chemical inventory. Updates of chemical inventories are required once a year. The chemical inventory program established by EH&S is still in development and can be inefficient for users. EH&S has employed students to aid the divisions in maintaining a current database, but the divisions are responsible for ensuring that the update is completed. Several divisions (AFRD, CSD, EETD, EH&S, Engineering, Facilities, LSD, MSD, NSD) used EH&S student assistance to restore their chemical inventory. Other divisions (ESD, Physics, PSF) performed their own updates of the chemical databases. Physical Biosciences has a written procedure for updating their chemical inventory and has student interns who routinely update the database.

Opportunities for Improvement

1. Although most divisions are conducting their hazard reviews more comprehensively than in previous years, the analysis and trending of such information on a Labwide basis is still difficult because of the diversity of the divisions' hazard review systems. The FY00 revision of Chapter 6 of PUB-3000 includes the development of an institutional hazard review system. However, this program has not yet been implemented. The level of consistency and documentation should improve as this system is employed. The new hazard review system, however, should consider the unique and effective hazard reviews now performed by the divisions.

2. The chemical inventory management program on an institutional level still requires improvement. After several years of identifying chemical inventory as an ES&H issue requiring enhancement, progress has been limited. While divisions are responsible for maintaining current chemical databases, the institution must provide the tools to efficiently perform this task.

Criterion 3: Control the Hazards
Performance Rating: 100%

Laboratory divisions ensure that engineering and administrative controls are in place to mitigate the identified hazards. Engineering controls that call for testing and certification (e.g., fume hoods, biosafety cabinets, glove boxes) and/or calibration (e.g., monitoring devices) must be done within the required test schedule. Signage that controls access and warns about hazards must also be updated for emergency

response purposes. Ergonomic evaluations, training, and controls must be instituted for appropriate work processes.

Criterion 3 Expectation	AFRD	ALS	Chemical Sciences	Computing Sciences	Directorate	EH&S	Engr	EETD	ESD	Facilities	LSD	MSD	Nuclear Sciences	Phys Biosci.	Physics	PSF	Expectation Score
% engineering controls certified and calibrated	100%	100%	100%	NA	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Signage & posting updated within past 12 months (y/n)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100%
Active ergonomic training and evaluations (y/n)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100%
Division Score	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Division Performance

1. All divisions ensure that their engineering controls are certified and calibrated. The divisions have different mechanisms for accomplishing this task. Addressing engineering controls during division inspections and walkthroughs is the most common method for ensuring that these items are compliant. In Facilities, their work-order system serves as an effective prompt for staff to perform monthly calibrations of monitors.

2. All divisions review their signage during self-assessment inspections.

3. All divisions demonstrated that they have an active ergonomics program. A few divisions have very proactive programs. Computing Sciences requires ergonomics training and workstation evaluation as part of its P2R process. Physical Biosciences and Engineering require ergonomic evaluations for all employees who average greater than four hours per workday at their computers. EETD has an assigned ergonomics chairperson on their safety committee.

Opportunities for Improvement

1. In general, the divisions are not authorized to calibrate and certify their engineering controls. However, the divisions must take responsibility for ensuring that their engineering controls are compliant. The divisions must be proactive and timely in seeking assistance with their glove boxes, hoods, and monitors. If support divisions cannot respond to the divisions' requests after an appropriate period of time, this issue should be addressed institutionally. Presently, however, support divisions are capable of meeting the demand.

2. Divisions must be proactive in implementing ergonomic programs. Divisions are encouraged to take advantage of ergonomic training, evaluator training, and workstation evaluations to address ergonomic hazards. Ergonomic injuries account for a large percentage of total recordable injuries and accidents sitewide. Divisions should consider the successful models of ergonomics programs established by Computing Sciences, Physical Biosciences, Engineering, and EETD.

Criterion 4: Perform the Work
Performance Rating: 91.9%

Laboratory divisions perform work within the requirements and conditions of existing work authorizations. Authorizations can be division self-authorizations, EH&S authorizations (e.g., RWAs, RWPs, SSAs, AHDs), and authorizations issued by regulatory agencies (EBMUD, BAAQMD, DHS, DTSC). Work must also be performed by trained and proficient staff, guests, and visitors.

Criterion 4 Expectations	AFRD	ALS	Chemical Sciences	Computing Sciences	Directorate	EH&S	Engr	EETD	ESD	Facilities	LSD	MSD	Nuclear Sciences	Phys Biosci.	Physics	PSF	Expectation Score
% authorized work w/o major deficiencies	100%	100%	100%	NA	NA	100%	100%	100%	100%	NA	95%	100%	100%	100%	100%	NA	100%
% SAAs in compliance	100%	100%	98%	100%	NA	100%	97%	97%	97%	92%	95%	79%	94%	95%	100%	100%	97.8%
% QA failure rate	0.0%	22.2%	3.1%	0.0%	NA	0.0%	4.4%	7.7%	8.3%	0.0%	3.3%	7.3%	0.0%	4.3%	0.0%	NA	95.2%
# NOARs or exceptions	0	0	0	0	NA	1	1	0	0	0	1	1	0	0	0	NA	81.0%
# ORPS occurrences	1	0	0	0	0	1	0	0	0	2	1	0	2	0	0	1	91.7%
Injury & accident rates (TRC)	1.3	3.6	1.8	1.75	3.1	4.3; 29% imp.	1.3	0.5	4.2	5.8	2.9	1.2	0	4.0	2.2	13.1	81.3%
% job hazard questionnaire (JHQ) completed	94%	>95%	91%	93%	91%	92%	98%	93%	96%	94%	95%	92%	91%	93%	78%	95%	97.8%
% completion rate of required courses	89%	>95%	92%	89%	93%	98%	95%	97%	96%	93%	94%	96%	93%	93%	78%	98%	95.8%
% completion for emergency response training	96%	93%	100%	92%	100%	93%	90%	89%	72%	66%	96%	75%	100%	96%	100%	66%	85.4%
% waste reduction (haz, rad, & mixed)	70.8%	waste increase	8.7%	15.5%	NA	55.8%	45.7%	39.4%	35.4%	52.0%	34.3%	76.9%	0.5%	66.0%	waste increase	NA	95.2%
Division Score	100%	90.0%	100%	100%	93.3%	93.3%	93.3%	100%	90.0%	74.1%	96.7%	96.7%	95.3%	96.7%	90.0%	77.8%	91.9%

Division Performance

1. In general, the divisions have continued to improve their performance in the area of required training and JHQ completion, maintaining the positive momentum established last year. In almost all cases, division employees are completing required training and job hazard profiles at better than 85%. Only Physics and Facilities were unable to meet the 85% benchmark for training completion. The only difficulty with regard to training is that some divisions use job hazard profiles that differ slightly from the institutional questionnaires. In these situations, it can be difficult to monitor training progress because these systems aren't fully compatible with the institutional Web-based database. As a result, EH&S training personnel must enter training information into the database in a way that is cumbersome and inefficient. This can result in inaccurate training records. The EH&S training team should work with the divisions to develop a system that will accommodate and support division-specific job hazard questionnaires more efficiently.

2. Most divisions performed authorized work without major deficiencies. Only two incidents involving RWAs were categorized as major deficiencies; both of these occurred in Life Sciences.

3. Although some deficiencies still exist, most divisions performed well in the area of waste management. Division compliance with Satellite Accumulation Area requirements remained approximately 91%. Only one division (MSD) is performing at a waste storage compliance rate of less than 90%. Three Nonconformance and Corrective Action Reports (NCARs) were issued this year for waste-characterization inaccuracies (one each in EH&S, Engineering, and Life Sciences), and one was issued for a waste-storage violation (MSD). Overall the laboratory had a waste characterization QA failure rate of 3.34%. Only one division (ALS) had an unacceptable QA failure rate.

Opportunities for Improvement

1. Overall, performance has improved for required training completion and JHQ completion. However, emergency team training continues to lag. In five divisions, less than 80% of emergency team members are fully trained. This is a potential liability, should the laboratory experience a serious emergency. EH&S training support has added a feature for emergency team training to the Web-based training database. Divisions can now view the training performance of their emergency team members more efficiently than previously available. Divisions should take advantage of this opportunity to more closely monitor emergency team training and address deficiencies.

2. While the divisions' waste management performance improved in the FY00 reporting period, waste characterization and storage compliance continue to offer an opportunity for improvement. The Waste Management Group has begun a practice of sending monthly updates to the divisions addressing their waste-characterization performance. This will allow divisions to address deficiencies in a more timely fashion. In addition, Waste Management has pledged to more aggressively pursue cases in which waste is approaching the allowable storage time, including Group Leader involvement as required. However, the divisions are ultimately responsible for accurate waste characterization and waste storage compliance, and must work to address these deficiencies internally. MSD, for instance, has taken steps to address their waste-storage difficulties in order to prevent future violations.

3. Several divisions continue to experience reportable injuries and accidents at a rate higher than the DOE average. Divisions must work to reverse this trend. As was previously mentioned, ergonomic hazards continue to be an area of concern.

Criterion 5: Feedback and Improvement
Performance Rating: 98.4%

To promote feedback and continuous improvement in the workplace, Laboratory divisions conduct inspections and walkthroughs to identify and correct ES&H deficiencies. Division management is also expected to be active in soliciting feedback and involvement from their line managers and staff to improve or sustain the division safety plans.

Criterion 6 Expectations	AFRD	ALS	Chemical Sciences	Computing Sciences	Directorate	EH&S	Engr	EETD	ESD	Facilities	LSD	MSD	Nuclear Sciences	Phys Biosci.	Physics	PSF	Expectation Score
% work space inspected	100%	100%	100%	100%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LM participating in assessment (i.e., regular walkthroughs) (y/n)	partial	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	93.8%
LSAD completion rate	88%	90%	93%	95%	100%	96%	100%	96%	100%	92%	100%	100%	100%	87%	100%	100%	100%
Evidence of active safety management group (y/n)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100%
Division Score	91.7%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98.4%

Division Performance

1. All divisions have inspected their workspaces. Divisions use different methods for inspecting their workspaces. Most divisions (AFRD, ALS, Directorate, PBD) inspect their workspaces during the self-assessment inspections. Other divisions (Computing Sciences, CSD) require group leaders and PIs to inspect their space. Some divisions (such as EETD and Engineering) use a combination of both methods.

2. Most divisions have been successful in promoting line-management involvement in ES&H walkthroughs. Some divisions are very proactive in line-management involvement in inspecting work areas. In EETD, line managers are required to inspect their workspaces as part of their performance expectations. In Computing Sciences, all group leaders perform semiannual inspections of their workspaces. These inspections are documented and signed by the division director. Only AFRD did not demonstrate that line management inspections are occurring regularly.

3. In almost all divisions (AFRD, ALS, CSD, Computing Sciences, Directorate, EH&S, Engineering, EETD, Facilities, LSD, MSD, NSD, PBD, Physics, PSF), the division directors have performed walkthroughs of their divisional space.

4. Most divisions are currently using the LSAD to track corrective actions for deficiencies discovered during self-assessments. Two divisions (Physics, NSD) that are using internal systems to track LSAD deficiencies will soon use the Labwide system. Divisions must be proactive in ensuring that findings sent to the Work Request Center are addressed. Divisions should also use the Self-Assessment Manual (PUB-3105) as guidance in consistency in assigning hazard levels and differentiating institutional from noninstitutional findings.

5. All divisions have demonstrated their commitment to ES&H with active programs and safety management groups. The division management groups or safety committees meet regularly to address the specific ES&H issues of their organizations. Facilities uses the Behavior Based Accident Prevention program to implement improvements and lessons learned. Material Sciences periodically distributes safety bulletins and accident reports to all staff.

Opportunities for Improvement

1. In a few cases, division safety coordinators and safety management groups manage the division safety programs almost exclusively and thereby limit the involvement of line managers and staff. Divisions

must promote the involvement and support of the division director, principal investigators, and senior and middle managers. Line-management participation is a vital part of a robust and effective safety management program.

2. The LSAD corrective-action system should be used by all divisions. While use of this program has improved, a Web-based system will improve accessibility and consistency among the divisions.

Integrated Functional Appraisals (IFAs)

Integrated Functional Appraisals (IFAs) complement the division self-assessment programs by evaluating higher-hazard or more complex operations that demand ES&H expertise normally beyond the capabilities of the divisions. The appraisal teams are "integrated," consisting of EH&S subject matter experts as applicable from Industrial Hygiene, Occupational Safety, Health Physics, Occupational Medicine, Fire Safety, Environmental Protection, and Waste Management. The IFA teams (1) provide an ES&H technical review of division work activities and operations, (2) evaluate the effectiveness of existing controls, and (3) verify and update the Integrated Hazard Appraisal (IHA) database. The database provides an inventory of the physical, chemical, radiological, and environmental hazards in the division workspaces. It is important to keep the IHA database current because it is used to validate the Laboratory's Work Smart Standards and serves as the basis for each division's "authorized scope of work."

For FY00, IFAs were conducted in the following divisions:

Physics	April 2000
Chemical Sciences	July 2000

In addition, two other IFAs are scheduled for completion this fiscal year:

Materials Sciences	August 2000
Environment, Health & Safety	September 2000

Integrated Functional Appraisal Results

The completed FY00 IFAs for Physics and Chemical Sciences confirmed that the assessed divisions were generally operating within the requirements and conditions of their safety programs. No significant uncontrolled hazards were identified. The medium- and high-hazard facilities, in particular, were operating within the safety envelopes established by their work authorizations (AHDs, RWAs, RWPs).

Opportunities for improvement in the two IFAs are the following:

1. Physics needs to address ergonomic issues, for both computer and microscope use.

2. Chemical Sciences has some minor facility deficiencies, such as safety equipment and engineering controls issues.

Common noteworthy practices include:

1. For both divisions, the IFA teams determined that the divisions had successfully implemented an integrated safety management system. A very high level of commitment to safety was evident to the appraisal teams.

Safety Review Committee Management of ES&H (MESH) Reviews

The Safety Review Committee (SRC) is composed of representatives from each of the Laboratory's research and support organizations. The SRC MESH reviews evaluate the management of ES&H programs by Laboratory divisions. The reviews are peer reviews that provide a valuable perspective of ES&H from the viewpoint of researchers and line managers. Each Laboratory division is subjected to a MESH review on a triennial basis. For FY00, MESH reviews were conducted in the following divisions:

Physics	May 2000
Environmental Energy Technologies	May 2000
Physical Biosciences	June 2000
Directorate/Operations Administrative Units	June 2000
Advanced Light Source	June 2000
Accelerator and Fusion Research	July 2000

The FY00 MESH reviews for the six divisions validated that division management of ES&H programs is robust and effective. All assessed divisions had low injury/accident rates, few off-normal ORPS occurrences, and few instances of noncompliance with work authorizations or regulatory requirements. No uncontrolled hazards were discovered during the MESH reviews. Noteworthy practices and opportunities for improvements for each of the assessed divisions are described in Appendix E. Common deficiencies noted in most of the six divisions are listed below.

1. **Training.** Although all divisions improved their completion rates for Job Hazard Questionnaires (JHQs) and required training, full use of the JHQ and training database still does not exist.

2. **Corrective Actions.** Not all divisions are using the Laboratory Self-Assessment Database (LSAD) to its full capability. Common areas of concern include the following: (a) safety deficiencies found in self-assessments are not being entered into LSAD in a timely basis; (b) deficiencies are not being classified into the appropriate hazard level category; and (c) deficiencies processed through the Facilities Department Work Request Center are not being corrected in a timely manner.

3. **Safety Committees.** Safety committees in some divisions did not fully represent all programs within the division and/or did not communicate ES&H information to all division personnel.

4. **Line Management Accountability.** Not all principal investigators or managers are sufficiently involved in integrating ES&H into their program or operation.

Common noteworthy practices include:

1. Many divisions have established informative and user-friendly ES&H Web sites linked to their division home pages.

2. Senior management commitment to ES&H is evident through their participation in walkthroughs, conducting all-hands ES&H meetings, and rewarding personnel for exemplary ES&H performance.

3. Many divisions have customized institutional ES&H requirements to further assist their employees in complying with requirements. Division approaches include division ES&H brochures and newsletters, how-to manuals, and inspection and hazards checklists.

4. All divisions have steadily improved their overall ES&H performance as measured by the self-assessment performance criteria. Improved indices include work authorization compliance, injury/accident rates, ES&H communication, hazard analysis, training, waste management, and inspection activities.

ES&H Institutional Improvements

Status of FY99 Self-Assessment Corrective Actions

Each year, as a result of the annual ES&H self-assessment reports, the Laboratory identifies institutional issues that require management action. The status of the corrective actions for the institutional issues identified in the FY99 ES&H Self-Assessment Report is described below.

1. **Chemical Inventory Database.** EH&S staff have been using students to update the chemical inventory database. EH&S has plans for a Web-based inventory system. This new system will allow users to view and modify their hazardous-materials inventories online, so a more current sitewide inventory can be maintained. EH&S also hopes to make the database more user friendly (for example, by expanding the barcode system), but this is being deferred until funding is secure. A funding request has been submitted and will roll over into the subsequent budget cycle. There is currently no tentative timetable until funding is secured. In the interim, EH&S will continue "benchmarking" the chemical inventory systems at comparable facilities.

2. **Line Management and Staff Involvement.** This finding has been addressed in several ways: (1) At Safety Coordinator meetings, the EH&S Division Director has stressed the importance of line management involvement. (2) Laminated inspection safety cards were distributed to the Division Safety Coordinators. These cards serve as a guide for line management participating in inspections. (3) The FY00 self-assessment program includes line management participation as performance criteria. Most divisions met this requirement for the FY00 performance period. In addition, in most divisions the division director personally inspected the divisional workspace.

3. **ES&H Performance Evaluations.** All divisions are presently using methods for ensuring that visitors and guests integrate ES&H into their work. Divisions must demonstrate how they hold guests and visitors accountable for ES&H issues during the self-assessment reporting process.

4. **Tracking and Trending Corrective Actions.** The quarterly LSAD report has increased use of the LSAD database. Most of the divisions are currently using the database. A near-term goal is to make the LSAD database a Web-based system that will be used by all divisions.

5. **SRC MESH Reviews.** MESH reviews were scheduled and completed for six divisions this reporting period. The backlog of required reviews has been eliminated, and the SRC is currently on schedule for performing MESH reviews.

6. **LBNL/UCB Memorandum of Understanding (MOU).** The MOU is still unresolved. Several divisions now use a Safety Assurance Statement, signed by the principal investigators, to insure Berkeley Lab safety standards on the UC campus.

FY00 Recommendations for Institutional Improvements

Based on the results of the FY00 Division Self-Assessments, Integrated Functional Appraisals, and the SRC MESH reviews, the following opportunities for institutional improvement are recommended by the Office of Assessment and Assurance:

- **Chemical Inventory.** There is still a need to develop a less labor-intensive and more valuable information system for users than currently exists. EH&S staff have been using students to update the chemical inventory database. This methodology is a short-term solution. Due to the high demand for services, the students have been unable to provide timely updates for every division requesting their help. Also, this service doesn't provide a database that remains current. In the future, EH&S will employ a more interactive system, taking advantage of a Web-based inventory database and barcoding technology.

- **Corrective Action Database.** The use of LSAD by divisions to track self-assessment corrective actions is uneven. Divisions are inconsistent in their assignment of institutional and noninstitutional findings and in their assessment of hazard levels of findings. The divisions should use the guidelines prescribed in the Self Assessment Manual (PUB-3105) for more consistent application of LSAD. Divisions must also take responsibility in forwarding findings to the Work Request Center for resolution. EH&S is developing a universal, Web-based database. This will improve consistency and encourage use of LSAD.

- **ES&H Training.** Several divisions use internal systems for tracking training and job-hazard-profile completion rates. As a result, EH&S staff must manually enter training information for these divisions into the EH&S Training Database. Manual entry is inefficient and results in inaccurate training data. Divisions that use internal systems for tracking training should develop electronic databases, and EH&S should work with these divisions to accommodate their programs in a more efficient manner.

- **Ergonomics.** Although most divisions demonstrated during the self-assessment process that they have implemented ergonomics programs, ergonomic hazards continue to be a leading source of recordable injuries. Divisions must promote ergonomic awareness. Divisions should require people to attend ergonomic training and perform ergonomic evaluations on all at-risk workers.

Appendix A

FY 2000 Self-Assessment Performance Criteria

PERFORMANCE CRITERIA	EXPECTATIONS	VALIDATION
1. Define Work • The Division integrates ES&H into work and activities. • Line management is responsible for the protection of the public, the workers, and the environment. • Clear and unambiguous lines of authority and responsibility for ensuring ES&H are established and maintained at all organizational levels. • Resources are effectively allocated to balance programmatic, operational, and ES&H considerations.	1A. Division directors and line managers communicate ES&H expectations, goals, and policies to all staff. Examples of appropriate communication include: [I, II, IV]* • Annual all-hands division meetings • Research procedures and protocols include safety notes • Availability of safety committee minutes 1B. Division holds employees, guests, and visitors accountable for ES&H. 1C. Division has an approved and validated ISM Plan. [I, IV] 1D. Adequate funds and resources are allocated for controls of ES&H hazards. [IV]	V1. Is there evidence of ongoing communication of ES&H to all personnel, such as in division meetings, group meetings, and/or written communications? V2. Are division employees, guests, and visitors held accountable for ES&H? How? V3. Has the division reviewed and updated its ISM plan? V4. Are there ES&H issues or problems resulting from insufficient funds or resources?
2. Identify Hazards • Line management evaluates work (new and modifications) to identify hazards before work is performed and to establish authorization for performing work safely. • Line management systematically evaluates hazards to mitigate risk posed by work in their area.	2A. Line managers use Chapter 6 of PUB-3000 or equivalent for evaluating hazards and necessary authorizations for doing work safely. [II, V] 2B. Based on the hazards identified, the appropriate authorizations have been issued. (Note: covers all experiments and projects, including non-AHD activities) [V, VI, VII] 2C. Division maintains an inventory of its hazardous chemicals. [VII]	V5. For all division projects and programs, have hazard reviews been performed and documented to the division office? Do the reviews cover both new work and modification of existing work? V6. What authorizations have been issued for division work (includes division, AHDs, RWAs, SSAs, NESHAP, animal/human subjects)? Are the authorizations being reviewed at least annually or earlier when there are new hazards or changes to the work? V7. Does the division update its chemical inventory at least annually or more frequently if there is a high turnover of chemicals used?

PERFORMANCE CRITERIA	EXPECTATIONS	VALIDATION
3. Control Hazards • Administrative and engineering controls tailored to the hazards have been implemented.	3A. Certification of engineering controls and safety instrumentation is up to date. [V]	V8. Are fume hoods, biocabinets, and glove boxes being certified/checked at least annually or more frequently as required? V9. Are required monitors (toxic and flammable gas, stack emission, dosimetry) being calibrated and serviced at least annually or more frequently as required? V10. Do Lab-built safety systems and critical applications have documentation of conformance for parts that are known to be suspect/counterfeit (e.g., graded fasteners, circuit breakers, valves, electronic components, etc.)? Do division shops and stores inspect for suspect/counterfeit items as part of their self-assessment?
	3B. Signage and postings are appropriate for the work and associated hazards, including emergencies. [VII]	V11. Does the division update its signage and postings at least annually to accurately reflect the work, hazards, and emergency information of its projects and programs?
	3C. Line managers ensure that ergonomic issues are effectively addressed for their workstations and/or work processes. [V, VI]	V12. Has the division instituted ergonomic evaluations, training, and controls for its workstations and work processes.
4. Perform Work • Work is consistently performed within authorization. • Work is conducted in manner that protects the worker, the public, and the environment. • Line management ensures that staff possess the proficiency and knowledge commensurate with conducting their assigned work safely.	4A. Line managers ensure that their work is performed within authorization, safely, and in a manner that protects the environment. [I, VI]	V13. Conformance indicators: percent compliance RWAs percent compliance SAAs percent compliance QA waste samples number of NCARs number of ORPS occurrences below 3-year running average V14. Are the number of reportable injuries and accidents under the DOE average and/or below any division annual goal?
	4B. Training records document that required training for staff is current. [III]	V15. Percent completion of JHQs or equivalent system. V16. Based on JHQs or training profiles, percent completion rate for required courses.
	4C. Site- and task-specific training under authorizations (division, RWA, SSA, AHD) is current. [VI]	V17. Has staff listed in the applicable authorization completed all training required by the authorization?

PERFORMANCE CRITERIA	EXPECTATIONS	VALIDATION
	4D. Line managers ensure that Building Emergency Team members are fully trained to perform their responsibilities during an emergency.	V18. Percent division emergency team members who have completed all required emergency team training.
	4E. Stewardship: waste minimization performance goals are met or exceeded (data provided by EH & S). [IV]	V19. Waste minimization goals: percent reduction of mixed waste volume generated percent reduction of hazardous waste volume generated percent reduction of radioactive waste volume generated percent reduction of nonhazardous solid waste volume generated
5. Feedback and Improvement • Line management actively participates in corrective action planning and ensures that plans are effectively executed.	5A. Based on the work, associated hazards, and safety performance, line managers and staff do: [I, II, IV] • Walkthroughs (no formal data needed; response will be verified during OAA validation) • Participate in S/A. (Document S/A team membership.)	V20. Percent division workspace inspected. V21. Is there evidence that line management walkthroughs are occurring regularly in division workspaces (verified from staff interviews by OAA)?
• Divisions implement improvements based on feedback from self-assessment, lessons learned, benchmarking, Appendix F, and other vehicles that promote continuous improvement.	5B. Division tracks the corrective actions of findings identified in its self-assessment. [I]	V22. Percent completion rates for Levels 1, 2, and 3 LSAD-recorded deficiencies.
	5C. Division ES&H committee reviews ES&H data and reports (e.g., lessons learned, SAARs, incident reports, EH&S monitoring reports, Appendix F performance measures, etc.) and institutes appropriate mitigation measures or opportunities for improvement. [I, II, VII]	V23. Is the division office and/or safety committee active in reviewing ES&H data and reports, such as injury and accident rates, occurrence reports, performance metric results, and lessons learned, to mitigate hazards and improve the state of ES&H?

*ISMS principles related to expectations:

I. Line management accountability
II. Clear roles and responsibilities
III. Competence commensurate with responsibilities
IV. Balanced priorities
V. Identification of safety standards
VI. Requirements and operations authorization
VII. Hazard controls tailored to work being performed

Appendix B

FY00 Division Self-Assessment Performance Ratings

Rating the division ES&H performance is based on a color-coded system of determining whether each performance criterion and expectation is fully met, partially met, or marginally met. Points are assigned to the three performance grades, and a percent performance is calculated for each criterion and expectation and for overall division performance. The color-code and point system is described below.

3 pts	Green indicates that the criterion/expectation is fully met at a >85% performance level, and performance is deemed to be excellent to outstanding. For waste management performance, there are no NCARs, a QA failure rate <5% above the Laboratory average, an SAA compliance rate >90%, and a net waste reduction. For reportable occurrences, there is one or fewer occurrence, or fewer ORPs than the three-year divisional average. For injury and accident rates, there is a TRC >25% below the DOE average, or a 20% improvement from last year, or one case or fewer.
2 pts.	Yellow indicates that the criterion/expectation is partially met at a 60–85% performance level, and performance is deemed to be marginal to good/excellent. For waste management performance, there are no NCARs, a QA failure rate between 5% and 8% above the Laboratory average, an SAA compliance rate between 75% and 90%, and a net waste increase. For reportable occurrences, the number of ORPs equals the three-year divisional average. For injury and accident rates, there is a TRC rate <25% below or above the DOE average, or a 10% improvement from last year, or two cases.
1 pt.	Red indicates that the criterion/expectation is marginally met at a <60% performance level, and performance is deemed to be unsatisfactory to marginal. For waste management performance, there are one or more NCARs, a QA failure rate >8% above the Laboratory average, and an SAA compliance rate <75%. For reportable occurrences, there are more ORPs than the three-year divisional average. For injury and accident rates, there is a TRC >25% above the DOE average.
0 pt.	Not applicable to the division.

FY00 Division Self Assessment Performance

Criteria	Divisions / Expectations	AFRD	ALS	Chemical Sciences	Computing Sciences	Directorate	EH&S	Engr	Environ. Energy Tech	ESD	Facilities	LSD	MBD	Nuclear Sciences	Phys Biosci.	Physics	Production Sequence Facility	Expectation Score
1	Evidence of strong ES&H communication (y/n)	yes	yes	yes	yes	yes	yes	yes	yes	partial	yes	yes	yes	yes	yes	yes	yes	97.9%
	Employees, guests & visitors accountable for ES&H (y/n)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100.0%
	Evidence that ES&H plan is being implemented (y/n)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100.0%
	Resources and funds adequate to address all ES&H issues (y/n)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100.0%
2	% Work with hazard analysis	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100.0%
	% Authorized work being reviewed within past 12 months	100%	100%	100%	NA	NA	100%	100%	100%	100%	NA	100%	100%	100%	100%	100%	NA	100.0%
	Chemical inventory updated within the past 12 months (y/n)	yes	yes	yes	NA	NA	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100.0%
3	% Engineering controls certified & calibrated	100%	100%	100%	NA	NA	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100.0%
	Signage & posting updated within past 12 months (y/n)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100.0%
	Active ergonomics training and evaluations (y/n)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100.0%
4	% Authorized work reviews w/o major deficiencies	100%	100%	100%	NA	NA	100%	100%	100%	100%	NA	95%	100%	100%	100%	100%	NA	100.0%
	% SAAs in compliance	100%	100%	98%	100%	NA	100%	97%	97%	97%	92%	95%	79%	88%	96%	100%	100%	97.2%
	% QA failure rate	0.0%	22.2%	3.1%	0.0%	NA	5.0%	4.4%	7.2%	5.3%	0.0%	3.3%	7.2%	0.0%	4.3%	0.0%	NA	95.2%
	# NOARS	0	0	0	0	NA	1	1	0	0	0	1	1	0	0	0	NA	81.0%
	# ORPS occurrences	1	0	0	0	0	1	0	0	0	3	1	0	2	0	0	1	81.7%
	Injury & accident case rates (TRC)	1.3	2.6	1.6	1.75	3.3	4.8; 28% improve	1.3	0.6	6.3	6.6	2.9	1.3	0	4.8	2.2	10.1	81.3%
	% Job hazard questionnaire (JHQ) completed	96%	>85%	91%	93%	91%	93%	89%	93%	88%	91%	95%	92%	91%	93%	78%	95%	97.9%
	% Completion of required courses	89%	>85%	95%	98%	93%	98%	95%	87%	88%	82%	91%	99%	93%	96%	78%	89%	95.0%
	% Completion for emergency response training	88%	92%	100%	92%	100%	93%	89%	89%	72%	58%	80%	75%	100%	96%	100%	30%	83.8%
	% Waste reduction (haz., rad., & mixed)	78.8%	waste increase	6.7%	15.3%	NA	55.0%	45.7%	284%	25.6%	32.0%	26.2%	75.0%	0.0%	68.0%	waste increase	NA	85.2%
5	% work space inspected	100%	100%	100%	100%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100.0%
	L/M participating in assessment (i.e., regular walkthroughs) (y/n)	partial	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	97.9%
	LSAD completion or on schedule	88%	86%	92%	96%	100%	98%	100%	86%	100%	82%	100%	100%	100%	92%	100%	100%	100.0%
	evidence of active safety management group (y/n)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100.0%
	Division Score	96.8%	95.8%	100.0%	100.0%	97.5%	97.2%	87.2%	100.0%	96.4%	86.4%	96.4%	96.4%	97.3%	98.0%	95.0%	83.0%	95.5%

Appendix C

FY00 Division Self-Assessment
Noteworthy Practices and Opportunities for Improvement

Division	Noteworthy Practices	Opportunities for Improvement
Accelerator and Fusion Research	• AFRD benefits from strong ES&H support, as demonstrated by the Division Director and Deputy. The Division Director memorandum dated June 1, 2000, emphasizes support for ES&H programs. • The AFRD Safety Committee meetings are well organized, with relevant agenda topics and speakers. Lessons learned appear routinely on the agenda.	• There is no evidence of management walkthroughs occurring regularly. • The LSAD completion rate has improved from the previous year. Until recently, many uncorrected LSAD items remained on the database, some dating back to 1998. LSAD items not referred to the Work Request Center (WRC) have been closed at a rate of 88%. Those referred to WRC have been closed at a rate of 54%. The Safety Coordinator recently sent a memo to the Deputy Facility Manager (Bert Schliefer) requesting assistance in closing old WRC LSADs. This communication led to the resolution of several findings. As a result, the overall completion rate has increased from 75% to 88%.
Advanced Light Source	• The ALS has a strong program that provides communication of ES&H issues up and down the line. An ALS Safety Committee meets monthly. Each group within the ALS is represented on the committee. These representatives relay information to their group Safety Circles, which include all division personnel. Minutes of the meetings are published. • Visitors with research projects are held accountable by signing the Experiment Summary Sheet. This practice ensures that all experimental setups at the ALS have a final safety review prior to startup.	• The LSAD completion rate was 61%, below an acceptable level. Recently, the ES&H Administrator forwarded uncorrected LSADs identified for completion to the Facilities Department. This action has increased the overall LSAD completion rate to 90%. • ALS has a very high QA failure rate for characterization of hazardous waste, 22.2%

Division	Noteworthy Practices	Opportunities for Improvement
Advanced Light Source (continued)	• The division safety committee routinely reviews lessons learned. Minutes reflect lessons learned as a topic of most meetings.	
Chemical Sciences	• The Division has made a great effort to increase awareness of Laboratory ES&H issues to those personnel working on the UC Berekeley campus. All PIs, including those working solely in UCB space, sign the Safety Assurance Statement (SAS) and the accompanying Project Hazard Questionnaire annually. In addition, all staff and visitors are required to complete a JHQ.	• Interviews indicate that PIs are often in areas occupied by their projects, programs, and operations, but the safety portion of these assessment and oversight activities needs to be better documented to drive lessons learned and improvement.
Computing Sciences	• Computing Sciences has been very thorough inspecting divisional space. All workspace in the division is inspected semiannually by line management. Documentation of these inspections and any subsequent findings is excellent. In addition, the Division Director led a management walkthrough of all divisional space. • As a result of semiannual inspections, Computing Sciences has a very effective LSAD program. Any findings resulting from these inspections are entered into the LSAD database. Findings are resolved in a timely manner. • Computing Sciences has a very aggressive ergonomics program. The division has a 93% completion rate for required ergonomics training. In addition, the division is very active in training ergonomics evaluators. • Computing Sciences has reduced	

Division	Noteworthy Practices	Opportunities for Improvement
	waste generation to one waste stream. The division is looking for ways to reduce or eliminate this waste.	
Directorate/ Ops	• The Directorate does an effective job inspecting workspaces. Over 99% of all departmental space was inspected this reporting period. These inspections were well documented and included line managers. • The Department proactively addressed ergonomics during the movement of 106 employees to Building 937. In addition, the Technology Transfer Department has remained current with preventative ergonomic evaluations for its personnel.	• Including ASD personnel, the Directorate's TRC is up slightly from last year (from 3.0 in FY99 to 3.1 in FY00). The Division TRC rate is slightly less than the DOE average (3.2). The cause of these cases is ergonomic injuries. The Directorate and ASD have made ergonomics a focus area and will hire an ergonomic expert in the near future.
Earth Sciences	• Earth Sciences routinely operates several offsite projects. To address ES&H issues for these activities, the division developed the Off-Site Safety and Environmental Protection Plans (OSSEP). OSSEPs are an effective method of promoting ES&H considerations for offsite projects.	• The Division Director and line management need to demonstrate greater commitment to ES&H concerns and to involve the Division Council in safety concerns of Division-wide impact. • ESD should consider policies, performance expectations, and actions that place safety responsibilities on line managers other than the Deputy/ES&H Coordinator. • The ESD injury and accident rate (TRC) has increased significantly from last year to this reporting period. The Division should develop a plan to address this issue.

Division	Noteworthy Practices	Opportunities for Improvement
Engineering Engineering (continued)	• Engineering developed and implemented a Supervisor Accident Analysis Report (SAAR) model that involves active participation of line management, workers, Division ES&H Coordinator, and Division EH&S Liaison. • The Division posts its ES&H performance graphically in Division buildings, allowing its staff to understand the goals and performance of the Division's ES&H program. • Division compliance with ES&H training requirements is exemplary: over 90% completion rates for required courses, including courses for emergency team members. • Safety is a standing agenda item at the Division Director's weekly group leader meeting. • The Division Director has performed safety inspections of all divisional workspace.	• The division received an NCAR for improper waste characterization.
Environmental Energy Technologies	• The Employee Responsibility Document on the EETD Web site is an ingenious, concise, and effective way to inform staff of their safety responsibilities and the Division's commitment to ensuring their safety and a safe workplace. • Hazard identification information is linked to space occupied by PI/project through the EETD Space Database. • The EETD ergonomics approach, based on Division Council awareness and commitment, a clearly stated policy and action plan, and aggressive awareness program, is a model to other divisions. • The recognition of the risks and responsibilities attendant with a lab	

Division	Noteworthy Practices	Opportunities for Improvement
	cleanout and the proactive actions taken by EETD senior management and the safety team stand as examples of pre-work planning by line managers and workers, a major goal of integrated safety management.	
Environment, Health and Safety Environment, Health and Safety (continued)	• Line management is very active in inspecting divisional workspace. In addition, when his schedule allows, the Division Director conducts monthly management walkthroughs of divisional space. • EH&S is very aggressive at mitigating deficiencies. Most deficiencies noted during inspections or walkthroughs are corrected within 24 hours. Findings that require greater than 24 hours for resolution are tracked via the LSAD database. Twenty-five out of 26 LSAD findings have been corrected. • The Division was very successful reducing waste this reporting period. Overall, waste generation for the division is down 55.8% compared to the previous reporting period. The Division generated no mixed waste this reporting period. • ES&H policies are communicated at all levels of the Division. The Division Safety Committee meets monthly. Safety is a standing agenda item at each group meeting within the Division. In addition, employees are held responsible for ES&H in their performance expectations.	• The division received an NCAR for improper waste characterization.
Facilities	• The Behavior-Based Accident Prevention (BBAP) program has been an effective tool for integrating ES&H into work activities. • The department uses the work request system to schedule safety activities. For example, BBAP observations are	• The training completion rate for emergency response training is very low, 54%. In addition, the training completion rate for required training is relatively low, 83%. • The department incurred five recordable occurrences this reporting

Division	Noteworthy Practices	Opportunities for Improvement
	scheduled and tracked through the work request system. • Facilities employs the use of a Hazards Review form for all projects prior to commencement of work. The Work Request Center incorporates this information into project work orders.	period. This is an increase from the previous two years. • The department has a very high total recordable case rate, 9.6 injury cases for every 200,000 hours worked.
Life Sciences Life Sciences (continued)	• LSD has made a concerted effort to further involve its senior and mid-managers in ES&H activities and self-assessments. Involvement includes walkthroughs by the Division Director and Deputy Director, inspections and certifications by principal investigators, and management leadership through the Director's Action Committee and the Safety Committee. • The Division has modified more than 50 workstations this past year to further their efforts of having ergonomically appropriate furniture in their work areas.	• Training for building emergency team members is at approximately 66%. It should be noted that the Division contributes 33 LSD staff on emergency teams, a level significantly greater than most divisions. • The categorization of LSAD deficiencies needs re-evaluation to ensure consistency with the hazard level definitions found in the Self-Assessment and LSAD manuals. • Although it is acknowledged that the new ergonomically appropriate workstations are a noteworthy practice, the Division should continue to focus on providing workstation evaluations and ergonomic training for staff in existing workstations.
Materials Sciences	• MSD has implemented an exemplary training program. They have rigorously applied the Training Checklist to all new employees and visitors. Training must be completed and verified by the supervisor before any work can be performed. To facilitate compliance, MSD developed a videotape and funded development of a CD and an online version of the commonly required classes. The information is based on presentations by EH&S staff who reviewed the final	• MSD should consider taking further action to bring SAA compliance to acceptable levels. The current oversight and enforcement approach has not been effective in bringing about sustainable improvements. Examples of such actions are (1) Standdowns of the laboratories and operations of the project involved. The length of suspension could be graded to the seriousness of noncompliance. (2) Refresher training for all SAA supervisors with new course material

Division	Noteworthy Practices	Opportunities for Improvement
	material. The CD version includes a self-test that must be passed before the supervisor can verify completion. An added advantage to this approach is that the MSD CD equivalent of EHS010 and EHS392 covers training for controlling site-specific workplace hazards common in MSD. PIs not meeting these requirements are on notice that their staff can be banned from the workplace and that fines to DOE funding may be assessed. • MSD has developed a Web site for enhancing safety awareness and training.	to emphasize the environmental needs and advantages of compliance and to redress recurrent noncompliant practices. (3) A short standdown for *all* MSD activities after the first NCAR in the coming year.
Nuclear Sciences Nuclear Sciences (continued)	• NSD is one of the few divisions that has a dedicated ES&H account to correct safety deficiencies. • NSD is the only division this year with no recordable injuries or accidents (0 TRC).	• Although there were increased ergonomic activities this past year, the division should continue to focus on systematically increasing ergonomic evaluations and training. • The Division incurred two ORPS occurrences. Efforts should be made to prevent recurrences of such incidents. • The LSAD database for documenting safety deficiencies and tracking corrective actions is underused. Additional effort is required in this area.
Physical Biosciences	• PBD communicates ES&H issues very effectively. The Division Safety Committee meets 10 times a year, and minutes are posted on the bulletin board in Calvin Lab. In addition, the Division Director communicates important ES&H concerns to all personnel. • The chemical inventory is updated continually. PBD has a written procedure, keeps the bar codes and inventory sheets in a central location,	

Division	Noteworthy Practices	Opportunities for Improvement
	and has a student intern routinely update the inventory. • PBD has an aggressive program to address ergonomics. Employees that spend more than four hours per day at a workstation must take EHS60; 89 staff members have taken this training. Workstation evaluations are provided, and the division is subsidizing the purchase of ergonomic chairs. • As a part of waste minimization efforts, the Division annually conducts a cleanout of offices and recycles notebooks and office supplies. • The Division Director sets the tone for line management involvement in PBD. He has walked all divisional space. In addition, the self-assessment process included 100% of the divisional space. PIs are required to participate in the self-assessment, including completing a safety checklist.	
Physics	• Physics' hazard review process is thorough and well documented. For all projects, regardless of hazard level, the Division uses their Project Safety Review Questionnaire and has the Safety Committee review and approve the document. • The Division has been exemplary in working within their established safety envelope and authorization basis. Physics has a 100% compliance rate and zero incidents for RWAs, SAAs, NCARs, ORPS occurrences, and QA sampling.	• The LSAD database for documenting safety deficiencies and tracking corrective actions is underused. Additional effort is required in this area. • Completion of the Job Hazard Questionnaires and required training is relatively low and requires improvement. • Although there were increased ergonomic activities this past year, the division should continue to focus on systematically increasing ergonomic evaluations and training.

Division	Noteworthy Practices	Opportunities for Improvement
		• Physics incurred an increase in waste minimization. Although it is acknowledged that the Division's waste generation is less than 1% of the total LBNL waste volume, preplanning is needed to maximize the opportunities for reducing wastes.
PSF	• In spite of the fact that PSF is a relatively small facility, PSF management has committed to a full-time onsite safety coordinator who has responsibility for both LBNL and LLNL employees. • PSF not only has an ISM plan but also has a safety plan that focuses on onsite operations. The plan is thorough in identifying and controlling hazards. Hazard information is updated at least annually.	• PSF has an extremely high injury/accident rate (13.1 TRC). A clear and comprehensive plan of action is required to mitigate the relatively high level of injuries and accidents. • The LSAD database for documenting safety deficiencies and tracking corrective actions is underused. Additional effort is required in this area. • Only 50% of emergency team members have completed all required emergency team training. Those members deficient in one training course are scheduled to attend this class soon.

Appendix D

FY00 Integrated Functional Appraisal
Noteworthy Practices and Opportunities for Improvement

Division	Noteworthy Practices	Opportunities for Improvement
Chemical Sciences	• When training records are corrected to exclude those CSD employees assigned full time to the UC Berkeley campus, completion rates of Job Hazard Questionnaires and required training courses is greater than 90%. • Waste storage compliance for the Division is 96%.	• There are minor facility issues in some of the Division's workspaces, such as deficiencies in safety equipment and engineering controls.
Physics	• The Division's review and control of significant hazards, such as toxic gas use in the Microsystems Lab and the liquid argon use in the Light Assembly Lab, are exemplary. • There is excellent control and supervision of the use of machine shop equipment by staff and students	• Ergonomics: There have been several computer-related ergonomic injuries to Physics Division employees and ASD employees assigned to work with Physics in recent years. In addition, there was a serious injury caused by extensive work under a microscope.

Appendix E

FY00 SRC MESH Reviews
Noteworthy Practices and Opportunities for Improvement

Division	Noteworthy Practices	Opportunities for Improvement
Accelerator & Fusion Research	• The Division Director has a strong commitment to ISM and safety in general. • Wim Leeman's lab is an excellent example of safety integration. • AFRD and matrixed employees conduct work within controls. There is a good working relationship with the EH&S liaison and a good match of technical expertise, since energetic circuits are the primary hazard of AFRD work. • With the exception of two ES&H performance criteria, AFRD is fully meeting expectations identified for ES&H self-assessment. • AFRD has an aggressive self-assessment program and has recorded many findings in LSAD.	• In some cases, the involvement of program heads in AFRD's ES&H system does not reflect the Division Director's commitment to safety. • AFRD does not hold Division-wide all-hands meetings where the Division Director can demonstrate his commitment to safety. • The AFRD approval process for AHDs is not well understood, and the current review process is sequential and uses only a few staff members. • Hazards not requiring formal authorizations may not be adequately considered. • AFRD has cluttered workspaces from the storage of old equipment. • AFRD needs to better identify and remove equipment not required for current or near-term work. • Many LSAD findings attributable to AFRD safety deficiencies remain open. • The EH&S Division needs to clarify LSAD policy and procedures.
Advanced Light Source	• The Division Director's understanding of the value of integrating safety into work planning and performance sets a benchmark for other division directors. • ALS has implemented memorandum of understanding with divisions having a large number of users or major research programs at the ALS. These MOUs set out the ES&H expectations of each participating division, such as	• The annual review of completion of JHQs and required training are not always accurately reflected in the EH&S Training Database. • As the number of beamlines and users has increased, the experimental area has become increasingly congested, resulting in restricted access and egress, limited headroom, and trip and seismic hazards.

Division	Noteworthy Practices	Opportunities for Improvement
Advanced Light Source (continued)	responsibilities and conduct-of-hazard identification, work authorization, and self-assessment. • The requirement that each research-project lead submit an Experiment Form summarizing the work and the associated hazards before work can start is in strict alignment with the initial two core functions and the first principle of ISMS. • ALS tracks and oversees implementation of AHDs of users from other divisions as if they were the responsibility of the ALS. • The ALS Division Director has established a policy of using spot awards to encourage workers to participate directly in and take the initiative for workplace safety. • ALS has a vigorous and mature assessment program that requires participation by all staff and rigorously inspects all space. • ALS takes a proactive stance towards recurrent safety concerns such as ergonomics and electrical safety. • The second part of the P2R form, specifying evaluation of ES&H performance, is used for ALS scientific ranks even though this practice is above and beyond Laboratory policy. • Safety problems observed during walkthroughs are fixed immediately whenever possible by funds made available through the ALS Division Office.	• A review of LSAD entries indicates that criteria for distinguishing between categories 3 and 4 may not be rigorously and consistently followed. In addition, the resolution of items in LSAD continues to lag.
Directorate/Ops Administrative Units	• The Directorate/Ops administrative units partnered with EH&S Division staff to conduct workstation evaluations for every staff member relocating to B937. Over 140 evaluations were completed after the moves.	• Safety responsibility for ASD matrixed employees in supported Division space is unclear. • The Directorate/Ops administrative units are not using LSAD to track corrective actions.

Division	Noteworthy Practices	Opportunities for Improvement
Directorate/Ops Administrative Units (continued)	• Senior management demonstrates a high level of commitment to ES&H by participating in safety reviews and walking through Directorate and Laboratory space for the specific purpose of reviewing safety.	actions. • Feedback from safety committee meetings may not be reaching each employee in the Directorate. • Directorate/Ops administrative units do not currently have a systematic, documented approach to conduct and track workstation evaluations.
Environmental Energy Technologies	• The EETD EH&S Web site is user friendly and provides a wealth of information and tools to assist EETD personnel in fulfilling their ES&H responsibilities and duties. • The safety coordinator prepares a quarterly Division safety report that describes the Division's current safety issues and performance as measured by key ES&H metrics. • EETD maintains a lessons-learned and safety-notes distribution log. • The active involvement of the Division Director and the continuous monitoring of activities by the EETD Safety Management Group have resulted in significant improvements in work performance. • The Division conducted an all-hands meeting earlier this year in which safety was a primary topic.	
Physical Biosciences	• The Division Director has taken a hands-on approach to ES&H in his Division, including participation in self-assess-ment walkthroughs followed by discus-sions of safety issues with onsite person-nel, the firm enforcement of Division safety policies, and encouraging the involvement of Appendix J space personnel in the LBNL safety program. • A charter for the PBD ES&H Commit-tee was approved and implemented August 2, 1999. The charter stipulates	• Though the PBD safety committee is very active, participation by some research groups is minimal. • PBD is limited in enforcing training requirements for staff working in Appendix J campus space by the current MOU between LBNL and UCB. • Hazard assessments for Appendix J space are not performed rigorously and are also limited by the MOU. • The EH&S Training Database has

Division	Noteworthy Practices	Opportunities for Improvement
Physical Biosciences (continued)	the structure, function, and meeting schedule for the ES&H Committee, as well as prescribing specific duties and responsibilities of the members, one of which is to ensure that five minutes of the PI's group meeting be devoted to safety issues. • PBD has established a procedure using "Black Books" for each member of the Division. These books contain job descriptions, training requirements, and a record of course completion for each PBD member. • The Division maintains a well-trained Building Emergency Team in Calvin Lab. • In response to an ergonomic injury, the Division responded by not only buying the proper equipment for the injured employee, but also by performing a preventative assessment of Division practices and purchasing the necessary equipment and furniture to minimize injuries to other Division personnel. • Hazard activities are reviewed with each PI yearly and compared to training records to ensure that all personnel are adequately trained for their jobs and that AHDs are written and current.	several entries for JHQs and completion of training requirements that are inaccurate and need to be corrected. • There are housekeeping problems in both the Calvin Lab and at the ALS facilities.
Physics	• The Division's approach of integrating ES&H into its line management work plans and tailoring the formal aspects required for their Division's needs is commendable and serves as a model for many other divisions.	• Insufficient resources are being allocated to process ES&H data and reports in a timely manner. • The annual hazard review of existing projects is informal and lacks sufficient rigor. • The training profiles of Division employees are not being processed in a timely manner. • The Division is not adequately tracking its corrective actions resulting from inspections and other self-assessment activities.

Appendix F

List of Acrynyms and Abbreviations

AFRD	Accelerator and Fusion Research Division
AHD	Activity Hazard Document
ALS	Advanced Light Source
BAAQMD	Bay Area Air Quality Management District
BBAP	Behavior-Based Accident Prevention
CSD	Chemical Sciences Division
DHS	Department of Health Services (State of California)
DOE	Department of Energy (U.S.)
DTSC	Department of Toxic Substances Control (State of California)
EBMUD	East Bay Municipal Utilities District
EETD	Environmental Energy Technologies Division
EH&S	Environment, Health and Safety Division (LBNL)
ESD	Earth Sciences Division
ES&H	Environment, Safety, and Health (DOE term)
IFA	Integrated Functional Appraisal
IHA	Integrated Hazard Appraisal
ISM	Integrated Safety Management
JHQ	Job Hazards Questionnaire
LSAD	Laboratory self-assessment database
LSD	Life Sciences Division
MESH	Management of ES&H
MOU	Memorandum of understanding
MSD	Materials Sciences Division
NCAR	Nonconformance and corrective action report
NESHAP	National Emission Standard for Hazardous Airborne Pollutants
NSD	Nuclear Sciences Division
OAA	Office of Assessment and Assurance
ORPS	Occurrence Reporting and Processing System
OSSEP	Off-Site Safety and Environmental Protection Plan
PBD	Physical Biosciences Division
PI	Principal Investigator
PSF	Production Sequencing Facility
QA	Quality assurance
RWA	Radiological Work Authorization
RWP	Radiological Work Permit
SAA	Satellite accumulation area
SAAR	Supervisor Accident Analysis Report
SRC	Safety Review Committee
SSA	Sealed Source Authorization
TRC	Total reportable cases
UCOP	University of California Office of the President